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NOMENCLATURAL CHANGES IN CALIFORNIA *MONARDELLA* (LAMIACEAE)

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ABSTRACT

Nomenclatural changes are proposed for several California *Monardella*. *Monardella undulata* Benth. var. *frutescens* Hoover and *M. odoratissima* Benth. var. *follettii* Jeps. are elevated to species status; *M. benitensis* Hardham is reduced to **M. antonina** Hardham subsp. **benitensis** (Hardham) Jokerst; and *M. douglasii* Benth. var. *venosa* (Torr.) Jeps., *M. villosa* Benth. var. *franciscana* (Elmer) Jeps., *M. villosa* var. *globosa* (E.L. Greene) Jeps., and *M. villosa* var. *obispoensis* Hoover *in* Jeps. are recombined as subspecies. The relationships and identification of these taxa are provided.

KEY WORDS: California, Lamiaceae, *Monardella*, taxonomy

Nomenclatural changes are proposed for several California *Monardella* that will be included in the forthcoming *The Jepson Manual: Higher Plants of California*, being prepared at the Jepson Herbarium, University of California, Berkeley. Changes include elevating two varieties to species status, reducing one species to a subspecies, and changing four varieties to subspecies. Each change includes a brief discussion regarding relationships and identification.

1. **Monardella antonina** Hardham subsp. **benitensis** (Hardham) Jokerst, *comb. et stat. nov.* BASIONYM: *Monardella benitensis* Hardham, Leafl. W. Bot. 10(13):239. 1966. TYPE: UNITED STATES. California: San Benito Co., along Clear Creek in asbestos-type serpentine soil, 11 July 1965, *Hardham 12672* (HOLOTYPE: CAS!; Isotype: US).

Monardella benitensis is considered a subspecies of *M. antonina* because of the characters they share and relatively minor differences in growth habit,

leaf habit, and stem and foliage vestiture that separate them. Both subspecies occur in the northern South Coast Ranges. These perennials have recurved outer bracts that resemble the leaves in color, texture, and vestiture; upright, leafy tipped, more leathery bracts of the middle series; verticillasters < 1.5 cm wide that are conspicuously glandular punctate and glandular hairy; ash colored, lance-ovate, leaves that are occasionally remotely serrate; and pale to deeply colored, lavender corollas.

The matted, low growing subsp. *benitensis* rarely exceeds heights of 6 dm; the pubescence of the stems and leaves is dense, shaggy, and spreading, and obscures punctate glands of the leaves; the leaves are generally folded when unpressed. The upright, openly branched subsp. *antonina* generally exceeds 6 dm; the pubescence of the leaves and stem is short, is ascending or appressed, and generally does not obscure the punctate glands on the flattened leaves.

Subspecies *benitensis* is restricted to barren, asbestos type serpentine of the Diablo Range, San Benito County. Subspecies *antonina* occurs on arid, exposed rocky sites on various geologic formations throughout the central portion of the South Coast Ranges from eastern Contra Costa Co., south to Monterey Co. Occasional populations of *Monardella villosa* from arid locales in the northern South Coast Range have conspicuously glandular, ash gray foliage; shorter, more compact hairs; and upright middle bracts are morphologically intermediate with subsp. *antonina* and may have hybrid origins.

The bract morphology and appearance of the diploid *Monardella antonina* implies a close relationship with the tetraploid *M. villosa*. The vestiture of subsp. *benitensis* resembles that of the tomentose forms of *M. villosa* described as varieties *subserrata* (E.L. Greene) Epling and *tomentosa* (Eastw.) Jeps., leading Hardham (1966a) to conclude subsp. *benitensis* may have provided the genetic stock for tomentose forms of *M. villosa*.

The tomentose forms of *Monardella villosa* should not be considered as subspecies because a graded series from sparse villous to tomentose plants can be found in *M. villosa* populations of the North Coast Ranges and Sierra Nevada foothills. Villous plants generally occupy protected, mesic, wooded localities, while forms corresponding to subspecies *subserrata* and *tomentosa* occur on arid, rocky sites, often only meters from sparsely villous forms.

2. Monardella frutescens (Hoover) Jokerst, *comb. et stat. nov.* BASIONYM: *Monardella undulata* Benth. var. *frutescens* Hoover, Leafl. W. Bot. 10(11):179. 1949. TYPE: UNITED STATES. California: San Luis Obispo Co., north edge of Santa Maria Valley on Arroyo Grande-Guadalupi Rd., in sandy field, 10 July 1947, *R.F. Hoover 7289* (HOLOTYPE: OBI!; Isotype: CAS!).

Morphological and habitat features suggest that *Monardella undulata* var. *frutescens* should be elevated to species status. Morphological characters, over-

lapping distributions, and occurrence on coastal sand dunes suggest a close relationship among *M. frutescens, M. undulata*, and *M. crispa* Elmer.

The perennial *Monardella frutescens* closely resembles the annual *M. undulata* of sand dunes along the immediate coast and those just inland in coastal sage scrub. *Monardella frutescens* is generally over 4 dm tall and has few secondary branches from the main stem. *Monardella undulata* is typically many branched near the base and rarely exceeds 4 dm. Problems arise in separating herbarium specimens because *M. frutescens* can flower the first growing season after germination (Hoover 1949), when plants closely resemble the annual species. Multiple samples and population wide study may be required to ensure proper identification. *Monardella frutescens* occurs along a 40 mile coastal strip in San Luis Obispo and Santa Barbara counties, whereas *M. undulata* ranges from Marin County, south to Santa Barbara County.

Although similar in geographic range, habitat, and morphology, *Monardella crispa* and *M. frutescens* are easily separated. Both perennial species are denizens of central California coastal dunes. Each has undulate, hairy leaves and many flowered verticillasters with rose-purple or lavender corollas. Complications in separating *M. crispa* and *M. frutescens* arise because they are sympatric throughout most of their ranges and appear to hybridize freely. Although the two species occupy different types of dune habitat and are distinguished by a suite of morphological characters, morphologically intermediate plants do occupy disturbed sites and some natural habitat transitions.

Monardella frutescens occurs on stabilized sand dunes of the immediate coast and coastal terraces in a species rich dune flora with relatively modest vegetative cover. In contrast, *M. crispa* is strictly confined to sparsely vegetated, unstabilized, or active dunes most frequently encountered along the immediate coast. Relatively constant winds and shifting sand characterize its habitat and limit the variety and cover of plant life. The pattern and range of morphological intermediacy at some sympatric populations indicate extensive introgression. Field observations have revealed that morphologically intermediate plants occupy partially stabilized dunes with plant cover and species richness intermediate between that associated with the two parental forms. Intermediates also frequent roadcuts and other disturbed sandy habitats and can outnumber pure, unhybridized plants.

Identification of these three species is aided by noting the variation in taxonomically important characters throughout the population and the type of dune habitat. Field observations should be interpreted in light of the fact that intermediates between *Monardella crispa* and *M. frutescens* occupy natural habitat transitions and disturbed sites. The trio of crisp leaved, coastal dune *Monardella* can be separated using the following key:

Key to the Crisp Leaved Coastal *Monardella*

A. Annual; plants low, compact; often many branched below, leaf blades generally longer than internodes; stem glabrous or sparsely villous. ... . *M. undulata* Benth.

A′ Perennial; plants upright, openly and sparingly branched; leaf blades generally shorter than internodes; stem sparsely to densely puberulent. . B

B. Plant compact, eventually with numerous, crowded stems forming mounds > 1 m across; stem matted white tomentose, green epidermis obscured; leaves oblanceolate, thick, fleshy, whitish from dense, minute puberulence; head generally > 1.5 cm wide; bracts generally 7-15 mm. ..... *M. crispa* Elmer

B′ Plant upright, openly branched with one or few main stems, not mound forming; stem sparsely tomentose, greenish purple epidermis visible; leaves linear to narrowly lanceolate, thin, green, nearly glabrous to thinly villous; head generally < 1.5 cm wide; bracts generally 6-10 mm. ..... *M. frutescens* (Hoover) Jokerst

Sympatric populations of *Monardella frutescens* and *M. crispa* occur throughout the geographic range of the more narrowly distributed *M. crispa*. Historic collections place the northern range limits of both species near Oceano, southern San Luis Obispo County. Both occur intermittently along the coast south for 30 miles to Surf, the type locality of *M. crispa*. *Monardella frutescens* ranges south an additional 10 miles to near Point Arguello. A collection (*Hickson 41* [CAS], 31 Mar 1988) with morphological traits intermediate between the two species indicates that both have occurred at or near Point Arguello.

Monardella frutescens is the only taxon that can presently be located at Surf, leading to questions regarding the true nature of the *M. crispa* holotype (Smith 1982). My examination of the holotype indicates that it is representative of the more northerly *M. crispa* populations such as occur at Point Sal, Oso Flaco Lake, and the Guadalupi and Pismo Dunes. The bracts and flower heads of the *M. crispa* holotype are at the extreme low end of the morphological range for the species, but its low, unbranched habit, woolly stem and leaf vestiture, and broad leaf clearly distinguish it from *M. frutescens*.

3. Monardella douglasii Benth. subsp. venosa (Torr.) Jokerst, *comb. et stat. nov.* BASIONYM: *Monardella candicans* Benth. var. *venosa* Torr., Pacific Railroad Report (Whipple Exp.) 4:123. 1856. *Monardella douglasii* Benth. var. *venosa* (Torr.) Jeps., *Fl. Calif.* 3:443. 1943. TYPE: UNITED STATES. California: Yuba Co., plain of the Feather River near Marysville, 25 May 1854, *Bigelow s.n.* (HOLOTYPE: NY!; Isotype: GH!).

Monardella douglasii Benth. var. *parryi* Jeps., *Man. Fl. Pl. Calif.* 884. 1925.

This combination is required because subsp. *venosa* is a morphologically defined geographic entity with close affinity to subsp. *douglasii*. The two subspecies are morphologically identical, differing only in quantitative aspects and geographic range. They both have bracts with the lateral veins perpendicular to the midrib and silvery translucent tissue in areas between the bract veins. Subspecies *venosa* is distinguished from subsp. *douglasii* on quantitative morphological characteristics and geographic range. Subspecies *venosa* of the Sierra Nevada and Cascade foothills in Butte, Yuba, and Tuolumne counties has verticillasters over 2 cm wide, with broadly ovate bracts over 1.5 cm long. Compared with most *Monardella*, the bracts of subsp. *venosa* are disproportionately large relative to the verticillaster. Subspecies *douglasii* of the North and South Coast Ranges, has verticillasters less than 1.5 cm wide, and lance-ovate bracts less than 1.5 cm long.

Subspecies *venosa* has been considered extinct (Smith & Berg 1988). Historic collections are known from four localities: one each from near Chico and Cherokee in Butte Co.; the type locality on the "plain of the Feather River near Marysville," Yuba Co.; and the most recent collection taken in 1935 near Copperopolis, Tuolumne Co. (*J.A. Rutter 211* [CAS]). Recent efforts by the author and others to relocate these historic occurrences have failed.

4. **Monardella follettii** (Jeps.) Jokerst, *comb. et stat. nov.* BASIONYM: *Monardella odoratissima* Benth. var. *follettii* Jeps., *Fl. Calif.* 3:437. 1943. TYPE: UNITED STATES. California: Plumas Co., Rich Gulch, NE slope of red Hill, 2 Aug 1937, *W.I. Follett 108* (HOLOTYPE: JEPS!; Isotype: JEPS!).

The distinctive, narrowly distributed *Monardella follettii* is reported from rocky serpentine slopes in the Sierra Nevada of Plumas Co., California. It is known from the canyon of the North Fork of the Feather River and Meadow Valley. The recently described *M. stebbinsii* Hardham & Bartel is partially sympatric with *M. follettii* in the canyon of the North Fork of the Feather River (Hardham & Bartel 1990).

Monardella follettii shares morphological attributes with a species complex of mostly glabrous, pink flowered serpentine endemics with narrow, leathery bracts. It most closely resembles *M. purpurea* Howell of the North Coast Ranges, which I treat as conspecific with *M. neglecta* E.L. Greene of Marin Co., and *M. villosa* subsp. *subglabra* Hoover of the South Coast Ranges (Jokerst *in* Hickman, in prep.). *Monardella palmeri* A. Gray, a serpentine endemic of the South Coast Ranges in Monterey and San Luis Obispo counties, also is allied with this complex. *Monardella follettii* is distinguished from these taxa by its

conspicuously glandular punctate bracts and calyces (vs. obscure), occasional hairs on the leaves and stems (vs. glabrous), unpressed heads less than 1.5 cm wide (vs. 1.5 cm), and lanceolate bracts (vs. ovate to lance ovate). The internodes of *M. follettii* are generally longer than the leaves and the heads are either solitary on tops of main branches, or in terminal capitate and whorled verticillasters. The related *M. purpurea* and *M. palmeri* generally have shorter internodes and solitary heads at the ends of main branches.

The remaining nomenclatural changes which follow are proposed to recognize, as subspecies, the morphologically and geographically distinct races of the widespread and polymorphic *Monardella villosa*. The article concludes with a key to subspecies of *M. villosa*.

5. **Monardella villosa** Benth. subsp. **franciscana** (Elmer) Jokerst, *comb. et stat. nov.* BASIONYM: *Monardella franciscana* Elmer, Bot. Gaz. (Crawfordsville) 41:320. 1906. *Monardella villosa* Benth. var. *franciscana* (Elmer) Jeps., *Man. Fl. Pl. Calif.* 881. 1925. TYPE: UNITED STATES. California: San Mateo Co., San Pedro, July 1903, *Elmer 4766* (HOLOTYPE: CAS!; Isotype: CAS!).

6. **Monardella villosa** Benth. subsp. **globosa** (E.L. Greene) Jokerst, *comb. et stat. nov.* BASIONYM: *Monardella globosa* E.L. Greene, Pittonia 5:82. 1902. TYPE: UNITED STATES. California: Alameda Co., Leona, August 1892, *Micheuen & Bioletti s.n.* (HOLOTYPE: ND-G!).

Monardella coriacea Heller, Muhlenbergia 1:35. 1904.

Monardella villosa Benth. var. *interior* Jeps., *Fl. Calif.* 3:436. 1943.

This distinctive subspecies is easily distinguished from *Monardella villosa* subsp. *villosa* based on stem, leaf, bract, and head size, and its generally sparse villosity (see key below). Compared with other *M. villosa* subspecies, the leaves and bracts of subsp. *globosa* are disproportionately large relative to the remainder of the plant. Neither Epling (1925) nor Munz (1968) recognized this taxon.

7. **Monardella villosa** Benth. subsp. **obispoensis** (Hoover *in* Jeps.) Jokerst, *comb. et stat. nov.* BASIONYM: *Monardella villosa* Benth. var. *obispoensis* Hoover *in* Jeps., *Fl. Calif.* 3:435. 1943. TYPE: UNITED STATES. California: San Luis Obispo Co., near Cuesta Pass, 20 Jun 1908, *Condit s.n.* (HOLOTYPE: JEPS!).

Key to the Subspecies of *Monardella villosa*

A. Stem and leaves appressed woolly, densely lanate to nearly glabrous; leaves triangular-ovate, base truncate. .....subsp. *franciscana* (Elmer) Epling

A′ Stem and leaves spreading villous, sparse to dense; leaves ovate to lance ovate, base obtuse. ..... B

B. Hairs branched and unbranched; plants matted; corolla white or lavender. ..... subsp. *obispoensis* (Hoover) Jokerst

B′ Hairs simple; plants matted or upright and openly branched; corolla blue or purple. C

C. Leaf blade 1.0-2.2 cm long; outer bracts 0.8-2 cm long; head 1-3 cm wide; stem < 0.5 m tall. ..... subsp. *villosa* Benth. (includes subsp. *subserrata* [E.L. Greene] Epling)

C′ Leaf blade 2.5-5.0 cm long; outer bracts 2-3 cm long; head 2-4 cm wide; stem > 0.5 m tall. ..... subsp. *globosa* (E.L. Greene) Jokerst

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